Jove:Final Report
Harding University 1992 - 1995
Brief Summary
(Detail Breakdown for Each Phase Attached)

Most aspects of the JOVE program at Harding University were very successful. The number and quality of students interested in space science areas was increased due to the availability of support funds for JOVE scholars. Both physics faculty associated with the program have continued work in areas associated with the JOVE program. Several additional research grants for student research and scholarship support have been received from the Arkansas Space Grant Consortium since the termination of the JOVE program. The network connection established has been used extensively for educational and research purposes in connection with awarded grants and with science education at Harding University.

The major unsuccessful area was in obtaining external funding in the area of solar physics in which Harding's JOVE program was working and in not more aggressively pursuing communication and cooperative effort with our JOVE mentor. This has resulted in all of the associated JOVE faculty no longer working in the solar physics area. The JOVE program has contributed significantly to the success of faculty programs in other areas that were fundable.

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Harding University 1992-1995

PHASE ONE

I. Research

Brief description of research results:

Because of the delay in receiving the computer workstation, most efforts were put into setup and organization of the system and development of the plans for the solar spectral, solar magnetic field, and mazimum entropy image restoration programs.

A computer program SPECTRA is being developed to aid in the analysis of Skylab spectral data. The program, written in PV-Wave command language for a Sun computer, is mneu driven for ease of use.

Projects currently underway are to improve the line fitting algorithm and correct for the "rubber cam" effect in Skylab's spectrometer.

An interface is being designed to run on Harding's Sun computer to allow the Maximum Entropy program MaxEnt, currently liscensed on a computer at MSFC, to be accessed locally over the internet. A program to calculate and display the solar magnetic field above the solar surface using solar magnetogram data is also beginning.

Communication with NASA colleague

There was extensive communication with our NASA colleague via e-mail, personal visits, and telephone conversations.

Refereed Journal Articles Submitted:

None

Other Publications Published:

None

Oral and Poster Papers Presented:

A poster presentation on Harding's JOVE outreach was presented at the JOVE conference

Philip Joyner and Lambert Murray, ANALYZING SOLAR SPECTRA, Arkansas Academy of Sciences, April 1993

Philip Joyner and James Mackey, SOLAR SPECTRA, Arkansas Space Grant Consortium April 1993

Paul Finley and James Mackey, GRAPHICAL REPRESENTATION OF SOLAR MAGNETIC FIELDS, Arkansas Academy of Sciences April 1993

Paul Finley, THE SOLAR MAGNETIC FIELD ABOVE THE SOLAR SURFACE, Arkansas Space Grant Consortium, April 1993

Proposals Awarded:

1. Agency providing funding: Arkansas Department of Education $ Amount $27,900
Title of projects/PI: AEGIS :MISSION MARS -- Steve Baber, James Mackey, Lambert Murray
Period of Performance: 1993
2. Agency providing funding: Arkansas Space Grant Consortium $ Amount 18,200
Title of project/PI Solar Energy Transfer Mechanism, James Mackey, Steve Baber, Lambert Murray
Period of peformance 1992/3

Proposals Submitted

1. Agency Submitted to : Arkansas Department of education $ Amount $27,900
Title/PI: AEGIS: MISSION MARS -- Steve Baber, James Mackey, Lambert Muttay
Period of Performance: 1994 Primary Use of Funds; outreach

Are you utilizing the Internet or other network?

yes, extensively for data transfer and information gathering.

Please identify the data sets, if any, used in your research.

UV spectral data from the Harvard spectrophotomer on Skylab

II. Student Involvement:

Indicate the impact that the JOVE program has had on student enrollment and/or recruitment?

The number of physics majors has increased from 1 to 2 per year to a value of 3 to 4 per year. The enrollment in the Astronomy & Space Science course has held steady at about 60 per semester.

Student Research Assistants:

N/A

III Curriculum Development:

New Curricula:

None

New Courses:

A new course in Astronomy & Space Science, Physical Science 113, has been added to the general education program at Harding University. Current enrollment is typically 60 per semester.

Ammended Courses or Augmented Courses:

None

Reading or independent study courses:

Weekly noncredit colloquim on space science and solar physics for JOVE scholars.

IV. Outreach:

Students: high school and middle school

Outreach Effort	Location	Estimated Number
1. AEGIS : Two week workshop for gifted 8th & 9th graders	Harding University	40

Teachers:

None

Public:

None

V. Summer Programs

For Students

AEGIS - MISSION MARS -Two week residential workshop in June for 40 eight and nineth grade students

For Teachers

Dr. Murray served as a science consultant for a math and science grant submitted to the Annenberg Foundation, designed to improve science and math instruction in rural area through telecomputing.

VI. Roadblocks to progress/suggestions

The initial roadblock was the delay in receiving the JOVE grant funds and the difficulty in obtaining the Sun workstation in a timely manner

VII. Other Activities

None

PHASE TWO

I. Research

Brief description of research results:

Work continued on the development and refinement of the computer program SPECTRA. Extensive rewrites were conducted of many of the program interfaces while work contined on developing more accurate line fits and line profiles.

A locally run PC Maximum Entropy Restoration program was obtained and applied to astronomical images. Work was begun on using the program with solar images. Better claculation and display procedures for plotting solar magnetic fields were developed.

Communication with NASA colleague

There was continued communication with our NASA colleague via e-mail.

Refereed Journal Articles Submitted:

None

Other Publications Published:

None

Oral and Poster Papers Presented:

Craig Copeland and Lambert Murray, SPECTRA: A Spectral Analysis Program, Arkansas Space Grant Symposium, April 1994

Richard Anderson and Lambert Murray, SPECTRA: Line Calaculations, Arkansas Space Grant Symposium, April 1994

Brian Mitchell and James Mackey, Graphical Representation of Solar Magnetic Fields, Arkansas Space Grant Symposium, April 1994

Proposals Awarded:

1. Agency providing funding: Arkansas Department of Education $ Amount $27,900
Title of projects/PI: AEGIS :MISSION MARS -- Steve Baber, James Mackey, Lambert Murray
Period of Performance: 1994

2. Agency providing funding: Arkansas Space Grant Consortium $ Amount 2,800
Title of projects/PI Solar Energy Transfer Mechanism, James Mackey, Steve Baber, Lambert Murray
Period of Performance: 1994

Proposals Submitted

1. Agency Submitted to : Arkansas Department of education $ Amount $27,900
Title/PI: AEGIS: MISSION MARS -- Steve Baber, James Mackey, Lambert Muttay
Period of Performance: 1994 Primary Use of Funds; outreach

Are you utilizing the Internet or other network?

yes

Please identify the data sets, if any, used in your research.

UV spectral data from the Harvard spectrophotomer on Skylab

II. Student Involvement:

Indicate the impact that the JOVE program has had on student enrollment and/or recruitment?

The number of physics majors has held fairly steady at 3 to 4 per year since JOVE began.

Student Research Assistants:

N/A

III Curriculum Development:

New Curricula:

None

New Courses:

None.

Ammended Courses or Augmented Courses:

None

Reading or independent study courses:

None

IV. Outreach:

Students: high school and middle school

Outreach Effort	**Location**	**Estimated Number**
1. AEGIS : Two week workshop for gifted 8th & 9th graders	Harding University	40
2. Dr. Murray made 2 slide presentations on space at area elementary schools	Searcy, AR	80

Teachers:
None
Public:
None

V. Summer Programs
For Students
AEGIS - MISSION MARS -Two week residential workshop in June for 40 eight and nineth grade students
For Teachers
None

VI. Roadblocks to progress/suggestions
A great difficulty lies in using undergraduates in a research program. As the student becomes knowledgeable about the research, he graduates.

VII. Other Activities
None

PHASE THREE

I. Research
Brief description of research results:
Work continued on the development and refinement of the computer program SPECTRA Input routines were rewritten to improve usability.
The PV Maximum Entropy routines were not useful on solar image data . Work also continued on the claculation and display procedures for plotting solar magnetic fields.
Communication with NASA colleague
Limited
Refereed Journal Articles Submitted:
None
Other Publications Published:
None
Oral and Poster Papers Presented:
Harry Garner and Lambert Murray,Calculating Line Ratios in Solar Spectral Data, Regional meeting of the AOK Section of AAPT, October 1995
Harry Garner, Solar Emmision Line Ratio Calculations, Arkansas Space Grant Consortium, Nov. 1995
James Mackey, Computer Imaging In Education, Arkansas Space Grant Consortium, Nov. 1995
Matt Lee and James Mackey, Using NIH Image, Arkansas Space Grant Consortium, Nov. 1995
Proposals Awarded:
1. Agency providing funding: Arkansas Department of Education $ Amount $27,900
Title of projects/PI: AEGIS : MISSION MARS -- Steve Baber, James Mackey, Lambert Murray
Period of Performance: 1995
2. Agency providing funding: Arkansas Space Grant Consortium $ Amount 2,800
Title of projects/PI Utilization of the Maximum Entropy Restoration Algorithm for the Analysis of Solar Image Data - Dave Anderson and James Mackey
Period of Performance: 1994
Proposals Submitted
1. Agency Submitted to : Arkansas Department of education $ Amount $27,900
Title/PI: AEGIS:MISSION MARS -- Steve Baber, James Mackey, Lambert Muttay
Period of Performance: 1995 Primary Use of Funds; outreach

Are you utilizing the Internet or other network?

yes

Please identify the data sets, if any, used in your research

UV spectral data from the Harvard spectrophotomer on Skylab

II. Student Involvement:

Indicate the impact that the JOVE program has had on student enrollment and/or recruitment?

The number of physics majors has held fairly steady at 3 to 4 per year since JOVE began.

Student Research Assistants:

N/A

III Curriculum Development:

New Curricula:

None

New Courses:

None

Ammended Courses or Augmented Courses:

None

Reading or independent study courses:

None

IV. Outreach:

Students

Outreach Effort	**Location**	**Estimated Number**
1. AEGIS : Two week workshop for gifted 8th & 9th graders	Harding University	40

Teachers:

None

Public:

None

V. Summer Programs

For Students

AEGIS - MISSION MARS -Two week residential workshop in June for 40 eight and nineth grade students

For Teachers

None

VI. Roadblocks to progress/suggestions

No New ones.

VII. Other Activities

None